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UNITED STATES PATENT AND TRADEMARK OFFICE****INVENTOR(S): Jose Angel de la Rosa et al****CONFIRMATION NO: 9699****SERIAL NO.: 10/626,157****GROUP ART UNIT: 3737****FILED: July 24, 2003****EXAMINER: Jaworski, Francis J.****SUBJECT: Medical Imaging Device and Method**

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Intellectual Property Administration
P.O. Box 272400
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PATENT APPLICATION

ATTORNEY DOCKET NO. 100200997-1

IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Jose Angel de la Rosa et al

Confirmation No.: 9699

Application No.: 10/626,157

Examiner: Jaworski, Francis J.

Filing Date: July 24, 2003

Group Art Unit: 3737

Title: Medical Imaging Device And Method

Mail Stop Appeal Brief-Patents
Commissioner For Patents
PO Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL OF APPEAL BRIEFTransmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on February 22, 2006.

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) \$500.00.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

☐ (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d)) for the total number of months checked below:

☐ 1st Month
\$120

☐ 2nd Month
\$450

☐ 3rd Month
\$1020

☐ 4th Month
\$1590

☐ The extension fee has already been filed in this application.

☒ (b) Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account 08-2025 the sum of \$ 500. At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account 08-2025 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 08-2025 under 37 CFR 1.16 through 1.21 inclusive, and any other sections in Title 37 of the Code of Federal Regulations that may regulate fees. A duplicate copy of this sheet is enclosed.

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Typed Name: Terri Walker

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Respectfully submitted,

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APR 17 2006

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

Jose Angel de la Rosa et al.

Serial No.: 10/626,157

Filed: July 24, 2003

Group Art Unit: 3737

Examiner: Jaworski, Francis J

Docket No. 100200997-1

For: Medical Imaging Device and Method

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

Mail Stop: Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

This Appeal Brief under 37 C.F.R. § 41.37 is submitted in support of the Notice of Appeal filed February 22, 2006, responding to the Final Office Action mailed September 7, 2005.

It is not believed that extensions of time or fees are required to consider this Appeal Brief. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required therefor are hereby authorized to be charged to Deposit Account No. 08-2025.

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I. Real Party in Interest

The real party in interest is Hewlett-Packard Development Company, LP, a limited partnership established under the laws of the State of Texas and having a principal place of business at 20555 S.H. 249 Houston, TX 77070, U.S.A. (hereinafter "HPDC"). HPDC is a Texas limited partnership and is a wholly-owned affiliate of Hewlett-Packard Company, a Delaware Corporation, headquartered in Palo Alto, CA. The general or managing partner of HPDC is HPQ Holdings, LLC.

II. Related Appeals and Interferences

There are no known related appeals or interferences that will affect or be affected by a decision in this Appeal.

III. Status of Claims

Claims 1-26 stand finally rejected. No claims have been allowed. The final rejections of claims 1-26 are appealed.

IV. Status of Amendments

This application was originally filed on July 24, 2003, with twenty-six (26) claims. In a Response filed June 15, 2005, Applicant amended claims 1, 3-8, 13, 18 and 19.

All of the above-identified amendments have been entered and no other amendments have been made to any of the claims. The claims in the attached Claims Appendix (see below) reflect the present state of the claims.

V. Summary of Claimed Subject Matter

The claimed inventions are summarized below with reference numerals and references to the written description ("specification") and drawings. The subject matter described in the following appears in the original disclosure at least where indicated, and may further appear in other places within the original disclosure.

Independent claim 1 describes an imaging system. Applicant's specification, page 3, paragraphs [0014] and [0015]; Figure 1, item 100. The imaging system comprises a sensor ring having a plurality of sensors mounted thereon to gather image data of external features of an object within the ring. Applicant's specification, page 4, paragraph [0016]; Figure 1, items 100, 102. The imaging system comprises a motor operatively connected to the sensor ring to move the ring about its longitudinal axis to rotate the ring about an object within the ring. Applicant's specification, pages 3-4, paragraph [0015]; Figure 1, items 100, 102, 116.

Independent claim 3 describes an imaging system. Applicant's specification, page 3, paragraphs [0014] and [0015]; Figure 1, item 100. The imaging system comprises a first imaging device for imaging an external surface of an object to be imaged. Applicant's specification, pages 5-6, paragraph [0021]; Figure 4, item 100. The imaging system comprises a second imaging device for imaging internal features of the object to be imaged. Applicant's specification, pages 5-6, paragraphs [0021] and [0022]; Figure 4, item 402. The imaging system comprises a processor operatively connected to the first imaging device and to the second imaging device, the processor to combine images from the first imaging device and the second imaging device to create a three

dimensional image of the external and internal features of the object to be imaged. Applicant's specification, pages 5-6, paragraphs [0021] and [0022]; Figure 4, items 100, 402, 408.

Independent claim 9 describes a method of imaging. Applicant's specification, page 1, paragraphs [0004] and [0005]; page 3, paragraph [0014]. The method comprises placing a subject to be imaged into a sensor ring. Applicant's specification, page 1, paragraph [0004]; pages 3-4, paragraphs [0014], [0015] and [0016]; page 5, paragraph [0020]; Figs. 2 and 3, items 102 and 120. The method comprises translating the sensor ring about a translational axis to image the length of the subject. Applicant's specification, pages 3-4, paragraphs [0015] and [0016]; Figs. 1, 2 and 3, items 102, 105, 106, 108, 110 and 120. The method comprises sensing subject external image information with sensors of the sensor ring. Applicant's specification, pages 3-4, paragraphs [0015] and [0016]; Figs. 1, 2 and 3, items 102, 104, 112 and 120. The method comprises processing received image information in a processor to generate a three dimensional representation of the subject. Applicant's specification, pages 3-4, paragraphs [0014], [0015] and [0016]; Fig. 4, item 408.

Independent claim 10 describes a method of imaging. Applicant's specification, page 1, paragraphs [0004] and [0005]; page 3, paragraph [0014]. The method comprises obtaining a three dimensional internal image of an object. Applicant's specification, pages 5-6, paragraphs [0021], [0022] and [0023]; Figure 4, item 402. The method comprises obtaining a three dimensional external image of the object. Applicant's specification, pages 5-6, paragraphs [0021], [0022] and [0023]; Figure 4, item 100. The method comprises processing the images in a processor. Applicant's specification, pages

5-6, paragraphs [0021], [0022] and [0023]; Figure 4, item 408. The method comprises combining the internal and external images to form a composite image. Applicant's specification, pages 5-6, paragraphs [0021], [0022] and [0023].

Independent claim 13 describes a method of imaging a subject. Applicant's specification, page 1, paragraphs [0004] and [0005]; page 3, paragraph [0014]. The method comprises providing a sensor ring having a plurality of sensors mounted thereon for sensing an object within the sensor ring. Applicant's specification, pages 3-4, paragraphs [0014], [0015] and [0016]; Figure 1, items 104, 112. The method comprises rotating the sensor ring around the object. Applicant's specification, page 4, paragraph [0016]; Figs. 1 and 2, items 102, 106, 120. The method comprises providing a linear axis along which the sensor ring travels, the linear axis normal to the angular rotation of the sensor ring. Applicant's specification, pages 3-4, paragraphs [0014], [0015] and [0016]; Figure 1, items 105, 108. The method comprises processing data relative to known position both rotationally and linearly to create a three dimensional image of the external features of the object. Applicant's specification, page 4, paragraph [0016]; Figs. 1 and 2, items 102, 105, 106, 110, 120; Figure 4, item 408.

Independent claim 18 describes an imaging device. Applicant's specification, page 3-4, paragraph [0015]; Figure 1, item 100. The imaging device comprises means for sensing external parameters of an object. Applicant's specification, page 3-4, paragraphs [0015] and [0016]; Figure 1, items 104, 112. The imaging device comprises means for rotating the sensing means around the circumference of an object. Applicant's specification, page 3-4, paragraphs [0015], [0016] and [0017]; Figure 1, items 102, 108, 116, 118. The imaging device comprises means for moving the sensing means laterally

along a length of the object. Applicant's specification, page 3-4, paragraphs [0015], [0016] and [0017]; Figure 1, items 102, 108, 116, 118.

Independent claim 19 describes a medical imaging device. Applicant's specification, page 3-4, paragraph [0015]; Figure 1, item 100. The imaging device comprises a computer having a processor. Applicant's specification, page 3, paragraphs [0012] and [0014]; pages 5-6, paragraph [0021]; Figure 4, items 404, 408. The imaging device comprises a sensor ring having a plurality of sensors, each of the sensors operatively connected to provide sensing data of external features of an object to the computer, wherein the sensor ring is movable in a first direction that rotates the ring substantially about an axis normal to the direction of rotation, and in a second direction that translates the ring linearly along the axis. Applicant's specification, pages 3-4, paragraphs [0015], [0016] and [0017]; Figure 1, items 102, 104, 112, 105, 106, 108, 110.

Independent claim 24 describes a method of generating an image of an object. Applicant's specification, page 1, paragraphs [0004] and [0005]; page 3, paragraph [0014]; page 6, paragraph [0024]. The method comprises obtaining an internal image of the object. Applicant's specification, page 6, paragraphs [0022], [0023] and [0024]; Figure 4, item 402. The method comprises obtaining a three dimensional external image of the object. Applicant's specification, pages 5-6, paragraphs [0021], [0022] and [0023]; Figure 4, item 100. The method comprises overlaying the internal image with the three dimensional external image. Applicant's specification, pages 6, paragraph [0024]. The method comprises saving the combined image in a machine

readable format. Applicant's specification, pages 6-7, paragraphs [0024], [0025] and [0026].

VI. Grounds of Rejection to be Reviewed on Appeal

The following grounds of rejection are to be reviewed on appeal:

1. Claim 9 has been rejected under 35 U.S.C. § 102(b) as being anticipated by Johnson ("Johnson", U.S. Pat. No. 4,222,274).
2. Claims 10-12 and 24-26 have been rejected under 35 U.S.C. § 102(b) as being anticipated by Seo, et al. ("Seo", U.S. Pat. No. 6,685,644).
3. Claims 1-2, 13-14, 16 and 18-23 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Johnson, further in view of Teboul ("Teboul", U.S. Pat. No. 5,709,206).
4. Claims 3 and 7 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Seo, further in view of Hossack, et al. ("Hossack", U.S. Pat. No. 6,423,002).
5. Claims 4-5 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Seo in view of Hossack, further in view of Johnson or Dick, et al. ("Dick", U.S. Pat. No. 4,233,988).
6. Claims 3 and 6 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Seo in view of Hossack, further in view of Martin et al. ("Martin", U.S. Pat. No. 6,275,722).

7. Claim 8 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over the references applied to claim 3 above, and further in view of Desai ("Desai", U.S. Pat. No. 5, 433,198).

8. Claim 15 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Johnson in view of Teboul as applied to claim 13, and further in view of Martin.

9. Claim 17 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Johnson in view of Teboul, further in view of Martin as applied to claim 15, and further in view of Seo.

VII. Arguments

The Appellant respectfully submits that Applicant's claims are neither anticipated under 35 U.S.C. § 102 nor obvious under 35 U.S.C. § 103, and respectfully requests that the Board of Patent Appeals overturn the final rejections of those claims at least for the reasons discussed below.

I. Claim Rejections - 35 U.S.C. § 102(b)

The PTO and the Federal Circuit provide that §102 anticipation requires each and every element of the claimed invention to be disclosed in a single prior art reference. (*In re Spada*, 911 F.2d 705, 15 USPQ2d 1655 (Fed. Cir. 1990).) Therefore, the absence from a cited §102 reference of any claimed element negates the anticipation. (*Kloster Speedsteel AB, et al v. Crucible, Inc., et al*, 793 F.2d 1565, 230 USPQ 81 (Fed. Cir. 1986)). Furthermore, "[a]nticipation requires that all of the elements and limitations of the claims are found within a single prior art reference." (*Scripps Clinic and Research Found. v*

Genetech, Inc., 927 F.2d 1565, 1576, 18 U.S.P.Q.2d 1001, 1010 (Fed. Cir. 1991). Moreover, the PTO and the Federal Circuit provide that §102 anticipation requires that there must be no difference between the claimed invention and the reference disclosure. (*Scripps Clinic and Research Found. v. Genetech, Inc.*, id.).

A. Rejection of Claim 9

Claim 9 has been rejected under 35 U.S.C. § 102(b) as being anticipated by Johnson (U.S. Pat. No. 4,222,274). Applicant respectfully traverses this rejection.

In the present case, not every element of the claimed invention is disclosed in the Johnson reference. Applicant discusses Johnson and Applicant's claims in the following.

1. The Johnson Reference

Johnson discloses an apparatus and method for ultrasound imaging of biological tissue according to the impulse-echo technique. More specifically, Johnson discloses an apparatus and method for reconstructing images of reflection in biological tissue or other media using synthetically focused ultrasound energy. Johnson, column 1, lines 6-13. Johnson's teachings are directed to noninvasive internal examination and medical diagnosis of the human body through ultrasound imaging of reflecting bodies within an ultrasound propagation medium (i.e., human organs, bones, and foreign inclusions within the soft tissue of the body). Ultrasound imaging, as discussed in Johnson, permits internal examination of an organ without damaging the surrounding tissue and organs of the body and with much less trauma to the patient. Johnson, column 1, lines 30-45.

Johnson notes that the primary disadvantage of such ultrasound imaging is the difficulty in providing reflection images of high quality resolution. The images can be blurred or distorted so that making an accurate diagnosis is difficult, particularly with respect to very small objects inside the body. Johnson, column 1, lines 46-54. Accordingly, Johnson discloses an improved ultrasound imaging apparatus and method capable of high quality resolution for images of reflection for highly delicate tissue. Johnson's disclosed device provides a significant advancement in the state of the art by providing noninvasive diagnostic techniques through internal ultrasound imaging. Johnson, column 2, lines 39-49.

2. Applicant's Claim 9

Applicant's claim 9 recites a method of imaging as follows (emphasis added):

9. A method of imaging, comprising:
placing a subject to be imaged into a sensor ring;
rotating the sensor ring about a first rotational axis to image the circumference of the subject;
translating the sensor ring about a translational axis to image the length of the subject;
sensing subject external image information with sensors of the sensor ring; and
processing received image information in a processor to generate a three dimensional representation of the subject.

It is clear from the above description and a reading of Johnson (e.g., columns 1 and 2) that Johnson's teachings are directed specifically and exclusively to internal imaging. Johnson's invention is directed to providing non-invasive diagnostics for internal imaging. Each and every mention of imaging in Johnson refers to internal

imaging. The assertion by the Office that Johnson is capable of imaging surface features of the breast is wholly unsupported. All of the images taken and used in Johnson are for internal imaging. In Johnson there is no mention or use of any external imaging such as the external imaging used in Applicant's claim 9. Furthermore, the Office explicitly admits that Johnson does not have a system adapted to gather external feature data of an object. At page 3 of the Office Action, the Office states that "Johnson does not explicitly state that the system is adapted so that external feature data can be gathered".

Because Johnson clearly does not disclose sensing external image information, the 102 rejection of claim 9 is not supported and the rejection should be withdrawn. In addition, because the Office clearly admits that Johnson does not disclose a system adapted to gather external feature data of an object, the Office cannot support its assertion that Johnson is usable for external imaging. Thus, claim 9 is allowable over Johnson and the 102 rejection should be removed.

B. Rejection of Claims 10-12 and 24-26

Claims 10-12 and 24-26 have been rejected under 35 U.S.C. § 102(b) as being anticipated by Seo (U.S. Pat. No. 6,685,644). Applicant respectfully traverses this rejection.

In the present case, not every element of the claimed invention is disclosed in the Seo reference. Applicant discusses Seo and Applicant's claims in the following.

1. The Seo Reference

Seo discloses an ultrasound diagnostic apparatus that includes first and second probes. In Seo, the inside of an object to be examined is scanned with a first ultrasound beam through the first probe to acquire first ultrasound image data associated with the object. Then the inside of the object is scanned with a second ultrasound beam through the second probe to acquire second ultrasound image data associated with the object. The second ultrasound image data is synthesized with the first ultrasound image data on the basis of the position of the first probe relative to the second probe, which is detected by a position detector. Seo, Abstract; column 2, lines 32-44.

2. Applicant's Claims 10-12

Applicant's claim 10 recites a method of imaging as follows (emphasis added):

10. A method of imaging, comprising:
obtaining a three dimensional internal image of an object;
obtaining a three dimensional external image of the object;
processing the images in a processor; and
combining the internal and external images to form a composite image.

The Office rejects claims 10-12 as being anticipated by Seo, and asserts that Seo "teaches method and structure for an external ultrasound imaging device 11, internal ultrasound imaging device 26 and a processor 18 which combines image portions as shown in Fig. 5 to create a composite 3D image display of the object including manipulable presentations as in fig. 10. The adventitia and artery immediate surroundment would be understood to be external surface features of the artery proper by the artisan." Office Action, page 2.

However, this is incorrect, as Seo's "external ultrasound imaging device 11" does **not** obtain external images of the body as the Office suggests. Rather, as indicated throughout Seo's disclosure, the external probe 11 gathers imaging information from **within** the object being imaged. Seo states the following at column 5, lines 19-40, regarding the external probe 11 (emphasis added):

The realtime 3-D external probe 11 is a probe of a type that is brought into contact with the body surface of an object to be examined, as shown in FIG. 3, unlike the internal probe 22 inserted into the object. *The external probe 11 has a plurality of two-dimensionally arranged transducers to scan a 3-D region inside the object with an ultrasound beam at high speed. . . . the center frequency of this ultrasound wave, for example, a frequency in the band of 1 to 10 MHz, preferably 2.5 MHz or nearby frequency, is selected to obtain relatively deep penetration.*

This passage and numerous others in Seo make it clear that the external probe 11 is not used for external imaging of an object as is generally claimed in claim 10. As another example, Seo recites the following at column 3, lines 35-41 (emphasis added):

A internal probe is designed to improve resolution using high frequencies at the sacrifice of penetration (depth of field). The field of view of the internal probe is therefore very narrow. *The lack of penetration of the internal probe is compensated by the intracorporeal tissue form information acquired through the external probe placed on the body surface.*

The common, well-known meaning of "intracorporeal" is that which exists *within the body*, or *within the corpus*. Seo's external probe 11 gathers form information on intracorporeal tissue (i.e., tissue *within* the body or object), which is used to compensate for the lack of penetration of the internal probe because of the use of the high frequencies to improve resolution.

It is clear from a reading of Seo that Seo's teaching is directed specifically and exclusively to internal imaging. All of the references to imaging in Seo refer to internal imaging. All of the images taken and used in Seo are for internal imaging. All of the probes described in Seo are used for internal imaging. There is no mention or use of any external imaging as such imaging is used in Applicant's claim 10.

Furthermore, the Office has incorrectly interpreted Applicant's claim without referring to the specification for a determination of the meaning of "external" in the claim. It is clear from a reading of the claims and the specification of the present application that the term "external" as used in the claims refers to the outside of a body. That is, "external" refers to the portion of the object or body that is fully outside and exposed to the atmosphere or the like. "External" as used in Applicant's specification and claims, clearly refers to the external features at the outside extent of the limits of the object or body, that is the outermost portion thereof.

By contrast, Seo is solely directed to imaging the internal features of a body. The entire purpose and operation of the apparatus of Seo is that of internal imaging. Still further, Applicant's claim 10 is a method claim which recites "obtaining a three dimensional internal image of an object" and "obtaining a three dimensional external image of the object." The obtaining of an external image of the object is not present in Seo. Seo does not teach obtaining any external image as defined in Applicant's claims and specification.

To further clarify the differences between Applicant's claim 10 and the teachings of Seo, Applicant's claim 10 is repeated herein below, followed directly by claim 1 of the Seo patent. Again, Applicant's claim 10 recites as follows (emphasis added):

10. A method of imaging, comprising:
obtaining a three dimensional internal image of an object;
obtaining a three dimensional external image of the object;
processing the images in a processor; and
combining the internal and external images to form a composite image.

By contrast, claim 1 of Seo (which provides a fair summary of the teachings of Seo as a whole), recites in part, as follows (emphasis added):

1. An ultrasound diagnostic apparatus comprising:
a first probe;
a second probe;
a first transmitter/receiver configured to scan the inside of an object to be examined with a first ultrasound beam through said first probe to acquire first ultrasound image data associated with the object;
a second transmitter/receiver configured to scan the inside of the object with a second ultrasound beam through said second probe to acquire second ultrasound image data associated with the object;

Clearly, any assertion that Seo teaches Applicant's claim 10 is simply untenable. Accordingly, for at least the reasons provided above, Seo does not anticipate Applicant's claim 10, and the 102 rejection of claim 10 and its dependent claims 11-12 should be removed.

3. Applicant's Claims 24-26

Applicant's claim 24 recites a method of generating an image of an object as follows (emphasis added):

24. A method of generating an image of an object, comprising:
obtaining an internal image of the object;
obtaining a three dimensional external image of the object;

overlaying the internal image with the three dimensional external image; and
saving the combined image in a machine readable format.

Claim 24 recites elements that are the same as or similar to those discussed above regarding claim 10. Furthermore, the Office rejects claim 24 on the same basis it rejects claim 10. Accordingly, the same reasoning discussed above showing the allowability of claim 10 over Seo is equally applicable to claim 24. Therefore, it is apparent that Seo does not anticipate Applicant's claim 24, and the 102 rejection of claim 24 and its dependent claims 25-26 should be removed.

II. Claim Rejections - 35 U.S.C. § 103(a)

As has been acknowledged by the Court of Appeals for the Federal Circuit, the U.S. Patent and Trademark Office ("USPTO") has the burden under section 103 to establish a *prima facie* case of obviousness by showing some objective teaching in the prior art or generally available knowledge of one of ordinary skill in the art that would lead that individual to the claimed invention. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). The Manual of Patent Examining Procedure (MPEP) section 2143 discusses the requirements of a *prima facie* case for obviousness. That section provides as follows:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference

teaching. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.

A. Rejection of Claims 1-2, 13-14, 16 and 18-23

Claims 1-2, 13-14, 16 and 18-23 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Johnson, further in view of Teboul (U.S. Pat. No. 5,709,206). Applicant respectfully traverses this rejection.

In the present case, the references do not teach or suggest all the claim limitations. In the following, Applicant discusses the applied references and their relevance to Applicant's claims.

1. The Johnson Reference

The Johnson reference is discussed herein above with respect to at least Applicant's claim 9.

2. The Teboul Reference

Teboul discloses a method and apparatus for processing a plurality of ultrasound images of ductolobular systems in a breast. In Teboul, an operator scans ductolobular systems within the breast axially and transaxially. A composite axial scan image is compiled by mapping associated transductal scan images to the axial scan segments. Teboul, Abstract. Teboul is directed specifically and exclusively to internal imaging of the breast. The imaging system of Teboul permits the operator to piece together several

sonograms to provide an entire ductal image (i.e., an image of the ducts within the breast). Teboul, column 1, lines 31-34. Teboul's system allows the showing of several ductal or all ductal lobular images in the breast in a three-dimensional manner, and in both an axial ductal manner and a transductal manner or view. Teboul, column 1, lines 43-50.

3. Applicant's Claims 1-2

Applicant's claim 1 recites an imaging system as follows (emphasis added):

1. An imaging system, comprising:
a sensor ring having a plurality of sensors mounted thereon to *gather image data of external features of an object* within the ring; and
a motor operatively connected to the sensor ring to move the ring about its longitudinal axis to rotate the ring about an object within the ring.

Applicant has already shown above that Johnson is solely directed to internal imaging and non-invasive ultrasound imaging of internal aspects of an object. The gathering of external features of an object as is recited in claim 1 is simply not contemplated in Johnson. The Office has admitted this, as noted above. Likewise, despite the Office Action's assertion to the contrary, Teboul also does not provide for such external imaging of objects. Reviewing the abstract of Teboul clearly shows that the Teboul invention is directed toward "processing a plurality of ultrasound images of ductolobular systems *in a breast*" (emphasis added). Any external features, as they are contemplated by the present claims, are provided in Teboul by templates. Teboul does not gather an external image. Rather, Teboul uses a template. Teboul states, for example, that "[t]he composite axial scan image is displayed with a clockface *template* of the breast, a vertical, cross-section template of the breast and a three dimensional

composite image of the breast.” Teboul, Abstract (emphasis added). Teboul further states that “[e]ach scan plane image is displayed at an angle with respect to the other plane and a composite three dimensional image is formed with a *template* showing the nipple.” Teboul, Abstract (emphasis added).

Accordingly, no combination of Johnson and Teboul teaches or suggests the subject matter of the present claim 1. Therefore, claim 1 is allowable over the combination of Johnson and Teboul, and the 103 rejection of claim 1 should be removed. Furthermore, claim 2 which depends from claim 1 is likewise allowable for at least the same reasons provided for claim 1.

4. Applicant's Claims 13-14 and 16

Applicant's claim 13 recites a method of imaging a subject as follows (emphasis added):

13. A method of imaging a subject, comprising:
providing a sensor ring having a plurality of sensors mounted thereon for sensing an object within the sensor ring;
rotating the sensor ring around the object;
providing a linear axis along which the sensor ring travels, the linear axis normal to the angular rotation of the sensor ring;
processing data relative to known position both rotationally and linearly to *create a three dimensional image of the external features of the object*.

As already discussed above with respect to at least claims 1 and 9, neither Johnson nor Teboul teach or suggest imaging the external features of an object, creating an image of the external features of an object, gathering external features of an object or the like.

Accordingly, claim 13 and its dependent claims 14 and 16 are allowable over the combination of Johnson and Teboul.

5. Applicant's Claim 18

Applicant's claim 18 recites an imaging device as follows (emphasis added):

18. An imaging device, comprising:
means for *sensing external parameters of an object*;
means for rotating the sensing means around the circumference of
an object; and
means for moving the sensing means laterally along a length of the
object.

As already discussed above with respect to at least claims 1, 9 and 13, neither Johnson nor Teboul teach or suggest imaging the external features of an object, creating an image of the external features of an object, gathering external features of an object, sensing external parameters of an object, or the like. Accordingly, claim 18 is allowable over the combination of Johnson and Teboul.

5. Applicant's Claims 19-23

Applicant's claim 19 recites a medical imaging device as follows (emphasis added):

19. A medical imaging device, comprising:
a computer having a processor;
a sensor ring having a plurality of sensors, each of the sensors
operatively connected to provide *sensing data of external features of an
object* to the computer, wherein the sensor ring is movable in a first
direction that rotates the ring substantially about an axis normal to the
direction of rotation, and in a second direction that translates the ring
linearly along the axis.

As already discussed above with respect to at least claims 1, 9 and 13, neither Johnson nor Teboul teach or suggest imaging the external features of an object, creating an image of the external features of an object, gathering external features of an object, sensing external parameters of an object, or the like. Accordingly, claim 19 and its dependent claims 20-23 are allowable over the combination of Johnson and Teboul.

B. Rejection of Claims 3 and 7

Claims 3 and 7 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Seo, further in view of Hossack (U.S. Pat. No. 6,423,002). Applicant respectfully traverses this rejection.

In the present case, the references do not teach or suggest all the claim limitations. In the following, Applicant discusses the applied references and their relevance to Applicant's claims.

1. The Seo Reference

The Seo reference is discussed herein above with respect to at least Applicant's claim 10.

2. The Hossack Reference

Hossack discloses INTRA-OPERATIVE DIAGNOSTIC ULTRASOUND MULTIPLE-ARRAY TRANSDUCER PROBE AND OPTIONAL SURGICAL TOOL. Hossack, Title. "Intra" is a well-known prefix meaning within, or inside. In this regard,

Hossack discusses a system, method, and probe for acquiring two-dimensional (2-D) diagnostic ultrasound image information and associated relative positional information to allow subsequent three-dimensional (3-D) or pseudo 3-D imaging for tissue assessment and collection. Hossack, column 1, lines 9-14.

Hossack is directed to gathering internal imaging information to permit 3-D imaging for tissue assessment and collection. The gathering of external features of an object as generally recited in Applicant's claims is not discussed or contemplated in Hossack.

3. Applicant's Claims 3 and 7

Applicant's claim 3 recites an imaging system as follows (emphasis added):

3. An imaging system, comprising:
a first imaging device for imaging an external surface of an object to be imaged;
a second imaging device for imaging internal features of the object to be imaged; and
a processor operatively connected to the first imaging device and to the second imaging device, the processor to combine images from the first imaging device and the second imaging device *to create a three dimensional image of the external and internal features of the object* to be imaged.

As already discussed above with respect to at least claim 10, Seo's teachings are directed specifically and exclusively to internal imaging. In Seo, there is no mention or use of any external imaging as such imaging is used in Applicant's claims. Likewise, Hossack is directed to gathering internal imaging information to permit 3-D imaging for

tissue assessment and collection. The gathering of external features of an object as generally recited in Applicant's claims is not discussed or contemplated in Hossack.

Applicant's claim 3 recites *imaging an external surface of an object and creating a three dimensional image of the external . . . features of the object*. Since neither Seo nor Hossack teach or discuss imaging the external features of an object in any respect, claim 3 and its dependent claim 7 are allowable over the combination of these references.

C. Rejection of Claims 4-5

Claims 4-5 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Seo in view of Hossack, further in view of Johnson or Dick (U.S. Pat. No. 4,233,988). Applicant respectfully traverses this rejection.

In the present case, the references do not teach or suggest all the claim limitations. In the following, Applicant discusses the applied references and their relevance to Applicant's claims.

1. The Seo, Hossack and Johnson References

The Seo, Hossack and Johnson references are discussed herein above with respect to various of Applicant's claims.

2. The Dick Reference

Dick discloses a high resolution rotating head ultrasonic scanner for detecting cancerous growths within the breast. Dick, column 1, lines 1-20. Like the Seo, Hossack

and Johnson references, Dick does not teach or discuss imaging the external features of an object in any respect.

3. Applicant's Claims 4-5

Applicant's claims 4-5 depend from claim 3, and therefore include all of the elements of claim 3. As discussed above, none of the Seo, Hossack, Johnson or Dick references teach or discuss imaging the external features of an object in any respect. As claim 3 includes the element of *imaging an external surface of an object*, so too do claims 4 and 5. Because none of the references teach this element, claims 4 and 5 are allowable over the combination of Seo, Hossack, Johnson and Dick for at least this reason. Accordingly, the 103 rejection of claims 4 and 5 should be removed.

D. Rejection of Claims 3 and 6

Claims 3 and 6 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Seo in view of Hossack, further in view of Martin (U.S. Pat. No. 6, 275,722). Applicant respectfully traverses this rejection.

In the present case, the references do not teach or suggest all the claim limitations. In the following, Applicant discusses the applied references and their relevance to Applicant's claims.

1. The Seo and Hossack References

The Seo and Hossack references are discussed herein above with respect to various of Applicant's claims.

2. The Martin Reference

Martin discloses methods and apparatus for magnetic resonance imaging with RF coil sweeping. Martin, Title. Magnetic resonance imaging is a well-known, intra-operative imaging modality that provides a noninvasive diagnostic procedure employing a magnetic resonance scanner to obtain detailed sectional images of the *internal structure* of the body. Martin, column 1, lines 22-50. Like the Seo and Hossack references discussed above, Martin does not teach or discuss imaging the external features of an object in any respect.

3. Applicant's Claims 3 and 6

Applicant's claim 3 recites *imaging an external surface of an object and creating a three dimensional image of the external . . . features of the object*. Since none of Seo, Hossack or Martin teach or discuss imaging the external features of an object in any respect, claim 3 and its dependent claim 6 are allowable over the combination of these references. Accordingly, the 103 rejection of claims 3 and 6 should be removed.

E. Rejection of Claim 8

Claim 8 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over the references applied to claim 3 above, and further in view of Desai (U.S. Pat. No. 5,433,198). Applicant respectfully traverses this rejection.

In the present case, the references do not teach or suggest all the claim limitations. In the following, Applicant discusses the applied references and their relevance to Applicant's claims.

1. The Seo, Hossack and Martin References

The Seo, Hossack and Martin references as applied to claim 3 are discussed herein above.

2. The Desai Reference

Desai discloses a system and technique of employing multi-electrode catheters for cardiac mapping and ablation. Desai, column 1, lines 6-8. Desai discusses a physical imaging system that images the heart *within* the body of a patient. Desai, column 5, lines 66-68. Thus, like Seo, Hossack and Martin, Desai does not teach or discuss imaging the external features of an object in any respect.

3. Applicant's Claim 8

Applicant's claim 8 depends from claim 3 which recites *imaging an external surface of an object and creating a three dimensional image of the external . . . features of the object*. Since none of Seo, Hossack, Martin or Desai teach or discuss imaging the external features of an object in any respect, claim 8 is allowable over the combination of these references. Accordingly, the 103 rejection of claim 8 should be removed.

F. Rejection of Claims 15 and 17

Claim 15 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Johnson in view of Teboul as applied to claim 13, and further in view of Martin. Claim 17 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Johnson in view of Teboul, further in view of Martin as applied to claim 15, and further in view of Seo. Applicant respectfully traverses these rejections.

In the present case, the references do not teach or suggest all the claim limitations. In the following, Applicant discusses the applied references and their relevance to Applicant's claims.

1. The Seo, Hossack, Teboul, Johnson and Martin References

The Seo, Hossack, Teboul, Johnson and Martin references have been discussed herein above as applied to various of Applicant's claims, including claim 13.

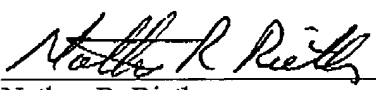
2. Claims 15 and 17

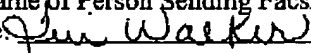
Claims 15 and 17 both depend from claim 13 which recites a method of imaging an object including to *create a three dimensional image of the external features of the object*. Since none of Seo, Hossack, Teboul, Johnson or Martin teach or discuss imaging the external features of an object in any respect, claims 15 and 17 are allowable over the combination of these references. Accordingly, the 103 rejection of claims 15 and 17 should be removed.

VII. Conclusion

In summary, it is Applicant's position that Applicant's claims are patentable over the applied prior art references and that the rejection of these claims should be withdrawn. Appellant therefore respectfully requests that the Board of Appeals overturn the Examiner's rejection and allow Applicant's pending claims.

Respectfully submitted,

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Registration No. 44,302

I hereby certify that this correspondence is being
facsimile transmitted to the U.S. Patent and Trademark
Office on 4-17-06 to PTO fax number (571) 273-8300.
Typed Name of Person Sending Facsimile: Terri Walker
Signature: 

Claims Appendix under 37 C.F.R. § 41.37(c)(1)(viii)

The following are the claims that are involved in this Appeal.

1. An imaging system, comprising:
a sensor ring having a plurality of sensors mounted thereon to gather image data of external features of an object within the ring; and
a motor operatively connected to the sensor ring to move the ring about its longitudinal axis to rotate the ring about an object within the ring.
2. The imaging system of claim 1, and further comprising:
a second motor to move the ring translationally along the longitudinal axis.
3. An imaging system, comprising:
a first imaging device for imaging an external surface of an object to be imaged;
a second imaging device for imaging internal features of the object to be imaged;
and
a processor operatively connected to the first imaging device and to the second imaging device, the processor to combine images from the first imaging device and the second imaging device to create a three dimensional image of the external and internal features of the object to be imaged.
4. The imaging system of claim 3, wherein the first imaging device comprises:

a sensor ring having a plurality of sensors mounted thereon to gather external image data from an object within the ring; and

a motor operatively connected to the sensor ring to move the ring about its longitudinal axis to rotate the ring about an object within the ring.

5. The imaging system of claim 4, wherein the first imaging system further comprises:

a second motor to move the ring translationally along the longitudinal axis.

6. The imaging system of claim 3, wherein the second imaging device is a magnetic resonance imaging device.

7. The imaging system of claim 3, wherein the second imaging device is an ultrasound device.

8. The imaging system of claim 3, wherein the second imaging device is an X-ray device.

9. A method of imaging, comprising:
placing a subject to be imaged into a sensor ring;
rotating the sensor ring about a first rotational axis to image the circumference of the subject;

translating the sensor ring about a translational axis to image the length of the subject;

sensing subject external image information with sensors of the sensor ring; and
processing received image information in a processor to generate a three dimensional representation of the subject.

10. A method of imaging, comprising:

obtaining a three dimensional internal image of an object;

obtaining a three dimensional external image of the object;

processing the images in a processor; and

combining the internal and external images to form a composite image.

11. The method of claim 10, and further comprising:

displaying the composite image on a display device.

12. The method of claim 10, and further comprising:

manipulating the image to view the image from a desired angle or angles; and

printing any image views desired.

13. A method of imaging a subject, comprising:

providing a sensor ring having a plurality of sensors mounted thereon for sensing an object within the sensor ring;

rotating the sensor ring around the object;

providing a linear axis along which the sensor ring travels, the linear axis normal to the angular rotation of the sensor ring;

processing data relative to known position both rotationally and linearly to create a three dimensional image of the external features of the object.

14. The method of claim 13, and further comprising:
saving the image in a machine readable format.

15. The method of claim 13, and further comprising:
combining the image with a magnetic resonance image.

16. The method of claim 13, and further comprising:
combining the image with an ultrasound image.

17. The method of claim 13, and further comprising:
overlaying the image with a MRI image; and
saving a combined image in a machine readable format.

18. An imaging device, comprising:
means for sensing external parameters of an object;
means for rotating the sensing means around the circumference of an object; and
means for moving the sensing means laterally along a length of the object.

19. A medical imaging device, comprising:
a computer having a processor;
a sensor ring having a plurality of sensors, each of the sensors operatively connected to provide sensing data of external features of an object to the computer, wherein the sensor ring is movable in a first direction that rotates the ring substantially about an axis normal to the direction of rotation, and in a second direction that translates the ring linearly along the axis .
20. The medical imaging device of claim 19, wherein the sensors are ultrasonic sensors.
21. The medical imaging device of claim 19, wherein the processor receives the sensor data and creates a three dimensional image of an object within the sensor ring.
22. The medical imaging device of claim 19, and further comprising:
a printer operatively connected to the computer, the printer to print generated images.
23. The medical imaging device of claim 19, wherein the sensor ring is moved with at least one motor.
24. A method of generating an image of an object, comprising:
obtaining an internal image of the object;

obtaining a three dimensional external image of the object;
overlaying the internal image with the three dimensional external image; and
saving the combined image in a machine readable format.

25. The method of claim 24, wherein saving comprises saving the combined image as a plurality of individual images.

26. The method of claim 25, and further comprising:
selecting one or more of the plurality of individual images for viewing.

Evidence Appendix under 37 C.F.R. § 41.37(c)(1)(ix)

There is no extrinsic evidence to be considered in this Appeal. Therefore, no evidence is presented in this Appendix.

Related Proceedings Appendix under 37 C.F.R. § 41.37(c)(1)(x)

There are no related proceedings to be considered in this Appeal. Therefore, no such proceedings are identified in this Appendix.